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To: Nabil Fayoumi cc: "Li, Ning/STL", "Johnson, Ike/MKE"
Subject: Prefinal Design Review - Sauget

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Nabil - please find attached our review comments on Solutia's Groundwater Migration Control System - Prefinal Design Document. Ike Johnson of our Milwaukee office provided comments on Volume 1 – Prefinal Design Submittal; Volume 2 – Construction Quality Assurance Plan; and Volume 4 – Contingency Plan. I reviewed Volume 3a/3b Field Sampling Plan/QAPP. Our comments are combined and provided in the attachment.

Please call with any questions.

Regards - Peter



FINAL-TECHNICAL MEMORANDUM SAUGE

Groundwater Migration Control System - Prefinal Design Review

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CH2MHILL has reviewed the documents provided by Solutia. They are:

- Volume 1 Geotechnical Data (incl. Attachments 4.1 and 4.2)
- Volume 2 Construction Quality Assurance Plan
- Volume 3a Filed Sampling Plan
- Volume 3b Quality Assurance Project Plan
- Volume 4 Contingency Plan

Our review focussed upon Volumes 1, 2, 3a, and 4. Because the project is a construction effort, a less-detailed review of Volume 3b (QAPP) was done. This presumes that the approved QAPP for the Sauget Area 2 RI/FS will also apply to the performance sampling associated with the GMCS construction; however this is not stated directly in Volume 3a.

General Comments

The workplans would benefit from additional technical details and better quality construction figures. A general lack of technical specificity within the text makes it difficult to fully understand or constructively critique the proposed project.

The number of proposed performance monitoring points - four pairs of piezometers and five sediment and surface water sampling locations - seems inadequate given the fact that the proposed barrier wall is 3,300 feet long: It is recommended that a minimum of four additional piezometer pairs be added and four sediment/surface water sampling stations be added to provide better and more consistent spatial coverage along the barrier wall.

Comments on Volume 1 and Volume 2.

Section 4.1.4 - Permeability and Strength

A higher permeability wall than 1×10^{-5} cm/sec would add significantly to the O&M costs for the pumping and extraction system. What is the highest permeability value that would be acceptable? Also, what would be the minimum acceptable unconfined compressive strength

for the grout material?

Section 4.2 - Basis of Barrier Design

What is the schedule for contractor selection and final design submittal? What are the criteria for selecting the contractor? Have any of the potential contractors installed barrier walls, using the methods described, to depths and into dense granular soil conditions similar to those found at this site?

Section 4.3.2 - Construction Sequence

What testing methods will be used to measure performance of the barrier wall? What grouting data will be collected, for example, pressures and grout takes over time? How will the grout-take and pressure data be compared to values expected for the formation? If no additional submittal is anticipated, how will the final site-specific design details be documented? Without additional design criteria, the EPA field observer will not be able to evaluate the if the results are satisfactory based on the pre-production tests. No specific criteria or performance measures are presented in this predesign submittal. A final design submittal should also be completed to document the results of the field tests.

Section 4.4.1 - Volume and Type of Spoils

Is the 30,000 CY estimate based on only one of the potential methods or is this a conservatively high estimate based on several of the potential construction methods? Will this estimate be revised based on the contractor and methods actually selected?

Specifications Section 3210 - Jet Grouted Groundwater Barrier

How will the pump test data be evaluated to determine the wall permeability? See comments and questions above. Additional quality control data is needed, including grout take volumes and pressures for each stage to document grout movement.

Comments on Volume 3a and 3b

Section 3.1.2 Groundwater Level Monitoring

The proposed locations of the four piezometer pairs appear to be next to the proposed monitoring well locations. This leaves at least six hundred feet between water level measuring stations. It is recommended that two additional piezometer pairs be added or the piezometer locations be moved to points in-between the monitoring well clusters to provide better linear coverage of water levels along the entire barrier wall length.

Also, there are no piezometers proposed for the two E-W wings of the barrier wall. It is recommended that two piezometer pairs be added along each wing to monitor hydrostatic pressures along the wing walls.

There are no construction details for the monitoring wells or the piezometers. For example, how far away from the actual wall will the wells and piezometers be placed? How deep will the wells and piezometers be installed? Appendix D is supposed to provide details of monitoring well construction but the associated diagrams are missing. These and other construction details (for example – piezometer construction) need to be provided.

Paragraph 3 states that pumping rates will not be adjusted unless head differentials persist for "one or two days". Which is it – one day or two? What is the rationale behind this?

Figure 2 – Performance Monitoring Sample Locations – is of poor quality and is largely illegible. A larger format map is required along with call-outs or individual drawings that provide details of each monitoring well cluster and piezometer pairing. Additionally, a geological section illustrating the relationship between the proposed wells and piezometers and the designated hydrogeologic units would be useful.

Section 3.1.3 – Sediment and Surface Water Monitoring

The text states that an Apparent Effects Threshold approach will be used to establish performance monitoring action levels for sediments and that a Toxic Units approach will be used to derive performance monitoring action levels for surface water. It is important to provide detailed methodologies that explain and justify these approaches for establishing action levels for sediments and surface water.

Section 5.3.1 – Surface Water Monitoring

What is the rationale for selecting sediment/surface water sampling locations 2, 3, 4, 5, and 9? These locations do not appear to represent a consistent sampling approach. Also, please explain why there are no reference upgradient or downgradient sampling locations proposed.